

# 2019-2020 IMPACTS AND ACCOMPLISHMENTS

## SUSTAINABLE FISHERIES AND AQUACULTURE

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## ACCOMPLISHMENTS

### S.C. Sea Grant Consortium Researchers Explore Social Carrying Capacity of Expanding Oyster Mariculture Along the Coast

**William Norman, Lauren Duffy, Jeffrey Hallo, and Laura Jodice, Clemson University**

**Recap:** Overall, a preponderance of support exists for oyster farming in South Carolina, particularly when it is well-managed and does not interfere with boating.

**Relevance:** As a result of the promotion of local seafood and growing familiarity with shellfish products such as oysters and clams, the demand and willingness to pay a higher price for farmed shellfish has increased, especially in coastal tourism destinations on the South Carolina coast. Recent research suggests S.C. residents and tourists are broadly supportive of existing mariculture, but there is little understanding of support for expansion of oyster mariculture, which will include highly visible infrastructure.

**Response:** S.C. Sea Grant Consortium researchers based at Clemson University are examining social carrying capacity among residents and waterway users who will be most directly impacted by expansion. They worked with an advisory group comprised of shellfish managers, commercial growers, local officials, business owners, and recreational users to develop a survey designed to reach stakeholder groups in Charleston and Beaufort counties in coastal South Carolina. Eighty interviews were conducted, including social value data (e.g., aesthetic, recreational, ecological, land-use, cultural) to be digitized onto S.C. Department of Health and Environmental Control mariculture permit maps.

**Results:** Overall, a preponderance of support exists for oyster farming, particularly when it is well-managed and does not interfere with boating. Oysters and oyster farming are often supported as culturally appropriate and as a mechanism for economic growth, local food production, and community vitality. The general public seems relatively under-informed, and in cases misinformed, about oyster farming; most concerns expressed about it are often related to this lack of knowledge. However, major issues of concerns are: boating access and safety, signage, and aesthetic concerns related to equipment, including gear type, size of farm, and distance/observability. There are opportunities for improved acceptance through better communication on management policies, environmental benefits, low environmental impacts, influences on wild oysters, and oyster harvesters. The visibility of oyster farms near bridges, size of the oyster farms, as well as the linear nature of oyster farms were deemed critical in the development of social carrying capacity research.

## S.C. Sea Grant Consortium Researchers Develop Novel Fish Aging Techniques

**Joe Quattro, University of South Carolina (USC) Baruch Institute; Michelle Passerotti, USC Department of Biological Sciences; Joe Ballenger, S.C. Department of Natural Resources Marine Resources Research Institute**

**Recap:** S.C. Sea Grant Consortium research led to development of novel methodologies for predicting both annual and daily ages from otoliths of red snapper, and predicting age to 17 years in sand tiger sharks. Additionally, a novel equipment modification for use in scanning very small otoliths for use with near infrared spectroscopy (NIRS) was developed.

**Relevance:** The ability to quickly detect changes in age and growth trajectories of fish is a key to successfully managing them. Current methods are time-consuming, expensive, and make real-time management more challenging. In addition, climate change presents new and dynamic challenges to the management of migratory fish species, potentially altering life cycles and habitat ranges. Developing novel aging methods in fish species is important to every stakeholder and end-user of fisheries resources, as it will improve the regulatory process and enhance management.

**Response:** S.C. Sea Grant Consortium researchers at the University of South Carolina and the S.C. Department of Natural Resources are estimating fish ages using near infrared spectroscopy (NIRS) on red snapper otoliths, a bony structure of the inner ear, and sand tiger shark vertebrae. Over 1,200 otoliths from Gulf of Mexico and Atlantic red snapper populations were scanned using NIRS, and comparisons to traditionally-aged otoliths confirm this methodology to be both faster and highly accurate for annual and daily aging.

**Results:** Consortium researchers expect time and cost savings associated with the NIRS method to be substantial, as NIRS data collection and age prediction for otoliths in NIRS models could be accomplished by a single person in much less time, as compared to traditional methods. Work on NIRS age prediction in sand tiger shark vertebrae is also nearing completion, though with different outcomes relative to those of red snapper. NIRS age prediction appears successful in aging sharks to ~17 years, however, age prediction in vertebrae older than 17 years appears to be untenable. Regional management councils are aware of efforts to develop NIRS methods for age prediction in multiple species, and management recommendations have been made recently in assessment workshops to consider use of NIRS for improving the scope and timing of production aging for managed species.

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